United States Environmental Protection Agency
Washington, DC 20460

Interagency Agreement/ Amendment

Part 1 - General Information

1. EPA IA Identification Number	2. Funding Location by Region
DW-13-92359501 - 0	EPA R5
3. Other Agency IA ID Number (if known)	**4. Awarding Office** IASSC East
5. Type of Action New	**6. IA Specialist:** NancyT Brown 202-564-3264 brown.nancyt@epa.gov

7. Name and Address of EPA Organization	8. Name and Address of Other Agency
US Environmental Protection Agency IASSC East 1200 Pennsylvania Avenue, NW Mail code 3903R Washington, DC 20460	Department of Commerce-NOAA Environ. Res Lab Great Lakes Environmental Research Laboratory 1315 East West Highway SSMC#3 RM11558. Silver Spring , MD 20910

9. DUNS: 029128894	10. BETC: DISB	11. DUNS: 147750301	12. BETC: COLL

13. Project Title and Description
GLRI IA-NOAA 2012

Pursuant to the Consolidated Appropriations Act, 2012, P.L. 112-74, EPA is providing funds to DOC's NOAA to help implement strategic, priority actions within the scope of the Great Lakes Restoration Initiative to achieve the vision of a restored, protected and sustainable Great Lakes ecosystem. Among other items, NOAA will track toxic substances in the Great Lakes, Restore habitat in the Great Lakes Basin.

14. EPA Project Officer (Name, Address, Telephone Number)	15. Other Agency Project Officer (Name, Address, Telephone)
Glenn Warren 77 West Jackson Blvd. (G-17J) Chicago, IL 60604-3507 312-886-2405 **E-Mail:** warren.glenn@epa.gov **FAX:**	Dr. Marie Colton 4840 South State Rd. Ann Arbor, MI 48108 734-741-2244 **E-Mail:** marie.colton@noaa.gov **FAX:** 734-741-2055
16. Project Period: 04/02/2012 to 03/01/2014	**17. Budget Period:** 04/02/2012 to 03/01/2014

18. Scope of Work (See Attachment)
See attached Scope of Work.

19. Employer/Tax ID No. 520852695	20. CAGE No: 347A4	21. ALC: 68-01-0727

22. Statutory Authority for Transfer of Funds and Interagency Agreement	23. Other Agency Type
Clean Water Act: Sec. 104(b)(2); Consolidated Appropriations Act; 2012; Public Law 112-74	Federal Agency

24. Revise Reimbursable Funds and Direct Fund Cites (only complete if applicable)

	Previous Funding	This Action	Amended Total
Revise Reimbursable (in-house)			0
Direct Fund Cite (contractor)			0
Total			0

Funds	Previous Amount	Amount This Action	Total Amount
25. EPA Amount		$14,508,767	$14,508,767
26. EPA In-Kind Amount			$0
27. Other Agency Amount		$0	$0
28. Other Agency In-Kind Amount			$0
29. Total Project Cost		$14,508,767	$14,508,767

30. Fiscal Information

Treas. Symbol	DCN	FY	Appropriation	Budget Org	PRC	Object Class	Site/Project	Cost Org	Ob/De-Ob Amt
682/30108	1205HBX005	1213	B	05HJ0	202BJ7XF1	2506			660,406
682/30108	1205HBX005	1213	B	05HJ1	202BJ7XF1	2506			940,000
682/30108	1205HBX005	1213	B	05HJ6	202BJ7XF2	2506			785,617

Fiscal (Continued)									
Treas. Symbol	DCN	FY	Appropriation	Budget Org	PRC	Object Class	Site/Project	Cost Org	Ob/De-Ob Amt
682/30108	1205HBX005	1213	B	05HJ0	202BJ7XF3	2506	-	-	1,351,404
682/30108	1205HBX005	1213	B	05HJ0	202BJ7XF4	2506	-	-	8,024,936
682/30108	1205HBX005	1213	B	05HJ0	202BJ7XF5	2506	-	-	2,746,404
									14,508,767

Part II - Approved Budget				EPA IAG Identification Number DW-13-92359501 - 0
31. Budget Categories	Itemization of All Previous Actions	Itemization of This Action	In-Kind Itemization of This Action	Itemization of Total Project Cost to Date
(a) Personnel		$969,590		$969,590
(b) Fringe Benefits		$229,852		$229,852
(c) Travel		$202,279		$202,279
(d) Equipment		$193,658		$193,658
(e) Supplies				$0
(f) Procurement / Assistance		$12,516,037		$12,516,037
(g) Construction				$0
(h) Other		$319,749		$319,749
(i) Total Direct Charges	$0	$14,431,165	$0	$14,431,165
(j) Indirect Costs:	$0	$77,602		$77,602
Charged - Amount Rate: 5% Base: $ Not Charged: Funds-Out: Not charged by Other Agency Estimate by other Agency Amount $				
(k) Total (EPA Share 100.00 %) (Other Agency Share 0.00 %)	$0	$14,508,767	$0	$14,508,767

32. How was the IDC Base calculated? Negotiated at a rate of 5% or less.

33. Is equipment authorized to be furnished by EPA or leased, purchased, or rented with EPA funds? ☒ Yes ☐ No
(Identify all equipment costing $1,000 or more)

34. Are any of these funds being used on extramural agreements? ☒ Yes ☐ No

Type of Extramural Agreement: Grant; Cooperative Agreement; Contract

Contractor/Recipient Name (if known)	Total Extramural Amount Under This Project	Percent Funded by EPA (if known)
TBD	12516037 Total $ 12,516,037.00	100

Part III - Funding Methods and Billing Instructions

35. **(Note: EPA Agency Location Code (ALC) - 68010727)**

☒ Disbursement Agreement — Request for repayment of actual costs must be itemized on SF 1080 and submitted to the Financial Management Office, Cincinnati, OH 45268-7002:

☒ Repayment — ☒ Monthly ☐ Quarterly ☐ Upon Completion of Work

☐ Advance — Only available for use by Federal agencies on working capital fund or with appropriate justification of need for this type of payment method. Unexpended funds at completion of work will be returned to EPA. Quarterly cost reports will be forwarded to the Financial Management Center, EPA, Cincinnati, OH 45268-7002.

☐ Allocation Transfer-Out — Used to transfer obligational authority or transfer of function between Federal agencies. Must receive prior approval by the Office of Comptroller, Budget Division, Budget Formulation and Control Branch, EPA Hdqtrs. Forward appropriate reports to the Financial Reports and Analysis Branch, Financial Management Division, PM-226F, EPA, Washington, DC 20460.

36. ☐ Reimbursement Agreement ☐ Repayment ☐ Advance
☐ Allocation Transfer-In

Other Agency's Billing Address (include ALC or Station Symbol Number)	Other Agency's Billing Instructions and Frequency

Part IV - Acceptance Conditions	EPA Identification Number DW-13-92359501 - 0

37. Terms and Conditions, when included, are located at the end of the 1610-1, or as an attachment.

Part V - Offer and Acceptance

Note: A) For Fund-out actions, the agreement/amendment must be signed by the other agency official in duplicate and one original returned to the Grants and IA Management Division for Headquarters agreements or to the appropriate EPA Regional IA administration office within 3 calendar weeks after receipt or within any extension of time that may be granted by EPA. The agreement/amendment must be forwarded to the address cited in item 29 after acceptance signature.

Failure to return the properly executed document within the prescribed time may result in the withdrawal of offer by EPA. Any change to the agreement/amendment by the other agency after the document is signed by the EPA Award Official, which the Award Official determines to materially alter the agreement/amendment, shall void the agreement/amendment.

B) For Funds-In actions, the other agency will initiate the action and forward two original agreements/amendments to the appropriate EPA program office for signature. The agreements/amendments will then be forwarded to the appropriate EPA IA administration office for signature on behalf of the EPA. EPA will return one original copy after acceptance returned to the other agency after acceptance.

EPA IA Administration Office (for administrative assistance)	EPA Program Office (for technical assistance)
38. Organization/Address U.S. Environmental Protection Agency IASSC East 1200 Pennsylvania Avenue, NW Mail code 3903R Washington, DC 20460	**39. Organization/Address** US Environmental Protection Agency R5 - Region 5 77 West Jackson Blvd. Chicago, IL 60604-3507

Award Official on Behalf of the Environment Protection Agency

40. Digital signature applied by EPA Award Official | FOR Frank N. Roth - Chief Fellowship IA & SEE Branch Michelle Messick - AO delegate	Date 05/30/2012

Authorizing Official on Behalf of the Other Agency

41. Signature	Typed Name and Title Please sign and return.	Date

Great Lakes Restoration Initiative
Interagency Agreement
Scope of Work

AGENCY NAME: Department of Commerce – National Oceanic and Atmospheric Administration

CONTACT INFORMATION: 1315 East West Highway, SSMC#3 Rm 11558
Silver Spring, MD 20910

1. INTRODUCTION

Decisions related to Great Lakes management are made every day. It is a priority of NOAA to ensure that local, state and federal natural resources managers and decision makers have the data, information, tools, and services they require to make the most informed choices to move forward on restoration and protection at the local and lakewide scale.

NOAA has been an important partner in the Great Lakes Restoration Initiative since it began in 2009. NOAA in the Great Lakes provides a unique federal niche in the nearshore area, where most people experience the Great Lakes. NOAA's mission of science, service and stewardship, and vision of resilient coastal ecosystems and communities, demonstrates that the agency is well positioned to advance Great Lakes Restoration. NOAA has focused its interdisciplinary strengths on an inter-related portfolio of projects, across the five focus areas of the GLRI and the overarching goals of AOCs, impacts of nutrients in priority watersheds and AIS, which present distinct challenges to our region. These challenges represent a spectrum of needs for which NOAA can develop and deliver on-the-ground services toward restoration, and provide information that can help inform effective adaptation actions and other decisions that in turn directly affect restoration of the nearshore area.

A significant portion of NOAA's GLRI funds is directed towards nearshore restoration through the Habitat and Toxic Substances focus areas. NOAA's work in these areas provides an extremely effective way to support the GLRI's current focus on AOCs by implementing a targeted approach to habitat restoration and marine debris removal in priority AOCs, directly benefitting BUI removal. The remainder of NOAA's funds is largely focused on integrating AOCs and the priority watersheds with the overall nearshore area by providing decision support tools for water quality prediction, non-point source pollution, land cover monitoring, and observing systems. NOAA is also taking a leading federal agency role regarding climate change adaptation and mitigation projects. NOAA's ability to provide land acquisition and restoration funds, monitoring and observations, and modeling and evaluation activities focused on nearshore areas, is a key component to the success of the Great Lakes Restoration Initiative. Using science to inform and validate the effectiveness of restoration activities is vital in ensuring the long-term sustainability of Great Lakes Restoration.

NOAA's past accomplishments in the 5 areas of the GLRI Action Plan include:

Toxics

- The Mussel Watch Program has aligned itself with the focus of GLRI to clean-up AOCs; it has established approx. 30 sites in AOCs to provide biologically-relevant data to aid in the assessment and removal of BUIs and delisting of AOCs in the Great Lakes.
- The Query Manger sediment-contaminant database was expanded by incorporating initial historical datasets from all Great Lakes states to include Water Chemistry and Oil Chemistry, which will be used to capture spill-related information such as that from the 2010 Enbridge spill

on the Kalamazoo River. To better serve user needs, four new query categories and new query results formats including XML, ESRI Shape file, and Google KMZ formats were added. A beta web-version of the software was also released.

Nearshore and Nonpoint Source

- The Nearshore Heath – Agricultural Indicators project has developed a project website; identified 34 candidate agriculture SOLEC indicators; compiled 13 candidate indicators into GIS maps; analyzed USDA Crop Data Layer for the Central US focusing on crop rotation patterns; and developed an integrative agricultural indicator metric that is now being prepared for a peer-reviewed publication.
- The Decision Support Tools for Nearshore Water Quality Prediction project has developed beach quality forecast models for seven beaches in Michigan and Indiana using the EPA Virtual Beach methodology. The project also developed a weekly HAB Bulletin, which measured, tracked and predicted trajectories for the Lake Erie algal bloom in summer/fall 2011 for 450 subscribers.

Habitat

- NOAA has provided financial and technical assistance to remove dams and barriers, construct fish passage, clean up marine debris, restore coastal wetlands, and remove invasive species. In 2010 NOAA funded 9 coastal habitat restoration projects, all of which have an approved QAPP and have begun collecting pre-monitoring data. Permitting, design, and bidding for many of the projects are complete and construction is underway. Completed activities include: 3 dams removed; approximately 125 stream miles opened, 122 metric tons and 365 cubic yards of vessel and surface debris has been removed. In 2011 NOAA is funding 3 implementation projects and 5 engineering and design projects.
- The Coastal and Estuarine Land Conservation Program (CELCP) provides state and local governments with matching funds to purchase significant coastal lands. GLRI FY2010 funding has resulted in the completion of 3 projects to date that protect 199 acres of coastal habitat along Lake Erie, Lake Michigan, and Lake Superior, with a fourth acquisition expected to be completed in early 2012. With FY2011 funds, NOAA is working closely with WI DOA and the Red Cliff Band of Lake Superior Chippewa towards a late November 2011 closing on the 88.6 acre Frog Bay CELCP site.

Observing Systems

- Observing system components have been deployed by NOAA GLERL on Western Lake Erie, Maumee Bay, Saginaw Bay, Muskegon and Cleveland in AOCs and impacted areas. Instrumentation deployed is providing observations of hypoxia, soluble reactive phosphorous and detection of harmful algal blooms. Real-time parameters are reported on a web-based data management system.
- Circulation models have been developed by GLERL for Western Lake Erie, Green Bay, Saginaw Bay, and the St. Lawrence River.
- GLERL is implementing a decision support system coordinating regional coastal observations supporting regional and national priorities utilizing models and on-water observations. These activities include the deployment & support of on-water and remote sensing platforms where observations from these systems are used to create database products for assessment and decision support. The system will provide an up-to-date (including real-time data) web presence to support accountability, management and restoration activities.

Climate

- NOAA Coastal Services Center (CSC) conducted a Basinwide inventory of elevation, topographic and bathymetric data by working with regional and state groups, to build a geospatial database where attribute information can be easily accessed.
- NOAA collected 900 linear kilometers of bathymetric lidar elevation data along priority shoreline areas of Lake Superior; information can be used to inform effective restoration projects, planning remediation of stamp sands, and protecting and restoring essential fish habitat.
- Regional downscaling work re-initiated regional discussion around climate change and water levels, emphasized the importance of asking the scientific questions and providing decision

makers with the best available information, and peeked interest in CHARM results and integrity testing planned for FY12 and beyond.

- Adaptation for Coastal Communities: Phase I publication of Regional Climate Needs Assessment identifying 300 Regional climate needs; Phase II publication forthcoming; NOAA Regional Climate Science Plan drafting underway. Three 1-day National Estuarine Research Reserve Adaptation trainings and two 3.5-day NOAA CSC Planning for Climate Change trainings held.

This FY2012 Interagency Agreement (IA) between EPA and NOAA will enable NOAA to continue applying sound science to Great Lakes Restoration work by transferring funds from EPA to NOAA to support NOAA's GLRI projects. Projects in this IA once again include work in all five Focus Areas. These projects will address numerous GLRI Action Plan measures, including:

Focus Area 1 – Measures 1,2,3,4,6
Focus Area 2 – Measures 1,3,4
Focus Area 3 – Measures 1,3,4,5
Focus Area 4 – Measures 1,2,6,7,9
Focus Area 5 – Measures 1,2,3

NOAA is well positioned to deliver integrated data, information, products, and services needed to support the Great Lakes basin. As a service-oriented agency, NOAA looks forward to building on our early foundation of achievements and utilizing our unique capacities in ways that will assist the Great Lakes region in more efficient restoration.

2. BUDGET & PROJECT DETAIL

Focus Area	Project Title	Draft Allocation
TX	Mussel Watch Expansion	$394,468
TX	Mercury Air Modeling	$170,470
TX	Sediment Database Expansion	$95,468
TX	Manistique – Mussel Bioaccumulation Study	$90,000
TX	Manistique – Debris Removal FS and Design	$850,000
IS	Regional Ecosystem Prediction Program – AIS in the Great Lakes	$687,617
IS	Sea Grant Outreach and Education	$98,000
Habitat	CELCP	$844,468
Habitat	AOC Land Acquisition	$844,468
Habitat	AOC Project Design and Implementation	$4,597,468
Habitat	Habitat Restoration Partnerships	$427,468
NS and NP	Decision Support Tools for Nearshore Water Quality Prediction	$844,468
NS and NP	Identification of Tipping Points for Agriculture and Land Use Indicators	$333,468
NS and NP	Land Cover Monitoring in Lakes Huron, Erie and Ontario/LaMPs	$173,468
AEMCP	General Observing Systems	$1,094,468
AEMCP	B-WET	$427,468
AEMCP	Climate Projects	$1,174,468
AEMCP	Assessment of Lake Ontario Benthic Macroinvertebrate	$50,000
TOTAL		**$13,197,703**

Toxic Substances and Areas of Concern

Title: Expanded Mussel Watch AOC Assessment
Funding: $394,468
Authority: The National Coastal Monitoring Act, provisions of the Estuary Restoration Act of 2000 (33 USC 2906) and the Office of Management and Budget Memorandum No. M-92-01 call for effective means of assuring dissemination of quality controlled data from environmental monitoring, assessment and restoration programs.
Work: NOAA's Mussel Watch Program (MWP) monitors the status and trends of chemical contamination and effects in U.S. coastal waters, including the Great Lakes. It is the longest continuous coastal monitoring program that is national in scope each year. This study will quantify legacy contaminants and trace elements in dreissenid mussels and sediment, screen for bioindicators of contaminant exposure in dreissenid mussels, characterize benthic infuana composition and conduct sediment toxicity assays to obtain relevant data that directly support removal of BUIs (degradation of benthos) and subsequent delisting of Areas of Concern (AOCs) in the Great Lakes. Specific objectives for FY12 work are:

1. Determination of spatial distribution of contamination in mussels within AOCs before and after planned remedial actions.
2. Determination of sediment contamination and benthic infauna composition using natural and artificial substrates to address degradation of benthos BUI.

Milestones:

- Baseline levels of chemical contaminants in the basin will be calculated and compared with local mussel and sediment contaminant levels.
- Benthic infauna characterization within AOCs will be assessed relative to contaminant levels and compared to reference areas.

Great Lakes Action Plan Measures of Progress: This project will provide quantitative benthic measurements i.e., infauna diversity, abundance, in addition to legacy contaminant measurements i.e., PCB, in mussel tissue and sediment that are needed to assess changes in benthos health. Specifically this project will provide results needed to address ecosystem health, legacy contaminant levels in biota, and the benthic degradation, thus supporting directly the decisions for removal of selected BUIs based on quantitative data and targeted end points. Focus Area 1 (Measures 2,3,4,6) and Focus Area 5 (Measure 1).

Title: Modeling Atmospheric Mercury Deposition to the Great Lakes
Funding: $170,470
Authority: Coast and Geodetic Survey Act, 33 U.S.C. 883d
Work: This project will extend the atmospheric mercury modeling work carried out in FY2010-2011 to analyze several different policy-relevant emission scenarios. Selection of scenarios will be based on consultation with relevant regulatory agencies (e.g., States, USEPA, IJC, UNEP, etc.) and other stakeholders. The project will utilize the NOAA HYSPLIT atmospheric fate and transport model to determine the amount of atmospheric mercury deposited to the Great Lakes under these different scenarios. This information will be useful to stakeholders in prioritizing specific policies to reduce mercury loadings to the Great Lakes.
Milestones:

- Complete identification and assembly of alternative emissions scenarios to be analyzed.
- Begin to carry out modeling for the various emissions scenarios to estimate the impact of each on the Great Lakes, including detailed source attribution information for each

scenario.

- Complete the modeling for each of the emissions scenarios investigated, and prepare a final report that describes the results.

Great Lakes Action Plan Measure of Progress:
Information generated in this project will support actions to prevent mercury contamination in the Great Lakes basin. Relative to the Action Plan, this project will support efforts to reduce toxic substance loading to the Great Lakes (Focus Area 1) and protect wildlife (e.g., reduce mercury exposure of fish-eating birds) (Focus Area 4), and will also support a variety of educational, evaluative, planning, coordination, and implementation activities among stakeholders (Focus Area 5).

Title: Great Lakes Watershed Sediment Contamination Database
Funding: $95,468
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010
Work: NOAA will expand its existing Great Lakes Query Manager database to include sediment-related environmental contamination data from sites in the Great Lakes and Great Lakes Tributaries. Data will be compiled from States and other partners. The database will serve as a centralized repository for Great Lakes data and will facilitate easy comparison or aggregation of data across studies, thereby helping to expedite the development, implementation, and monitoring of sediment cleanup and restoration projects throughout the Basin. The objective of expanding the database and refining the user interface is to provide a comprehensive tool for Great Lakes practitioners that supports remedial and restoration planning that will help expedite cleanup and restoration of AOCs and delisting of Areas of Concern beneficial use impairments.

This project helps expedite the remedial and restoration actions necessary to delist AOC beneficial use impairments by aggregating contaminated sediment-related data in a consistent, comparable format from multiple sources for all AOCs. The expansion of NOAA's existing Great Lakes Query Manager database will expedite the evaluation and design of Great Lakes Legacy Act projects. Similarly, data are routinely used throughout the Great Lakes at Superfund sites in investigation and sample plan design, ecological risk assessment, cleanup level derivation, development and evaluation of remedial alternatives, development of mitigation strategies, sediment and soil remediation design--including time-critical removal actions, natural resource damage assessment (pathway evaluation, injury determination, restoration project development, and scaling damages), and long-term effectiveness monitoring programs and other management activities needed to cleanup and restore the Great Lakes ecosystem.
Milestones:

- Dynamic inventory of available data sets
- Revised desktop version of QM Database tools
- Revised web version of QM Database tools
- User guidance web-site
- FY12 version Great Lakes QM Database

Great Lakes Action Plan Measure of Progress:
Information generated in this project will support work necessary to remediate and restore the Great Lakes basin. Relative to the Action Plan, this project will directly support efforts to de-list AOC beneficial use impairments (Focus Area 1) and restore habitats (Focus Area 4).

Title: Manistique – Mussel Bioacculumation Study
Funding: $90,000
Authority: The National Coastal Monitoring Act, provisions of the Estuary Restoration Act of 2000 (33 USC 2906) and the Office of Management and Budget Memorandum No. M-92-01 call for effective means of assuring dissemination of quality controlled data from environmental monitoring, assessment and restoration programs.
Work: NOAA's Mussel Watch Program (MWP) monitors the status and trends of chemical contamination and effects in U.S. coastal waters, including the Great Lakes. It is the longest continuous coastal monitoring program that is national in scope each year. This study will quantify legacy contaminants and trace elements in dreissenid mussels and sediment, screen for bioindicators of contaminant exposure in dreissenid mussels, characterize benthic infuana composition and conduct sediment toxicity assays to obtain relevant data that directly support removal of BUIs (degradation of benthos) and subsequent delisting of Areas of Concern (AOCs) in the Great Lakes. Specific objectives for FY12 work are:

1. Determination of spatial distribution of contamination in mussels within the outer harbor in the spring and late summer.
2. Determination of sediment contamination and benthic infauna composition using natural and artificial substrates to address degradation of benthos BUI.

Milestones: Baseline levels of chemical contaminants in the basin will be calculated and compared with local mussel and sediment contaminant levels. Benthic infauna characterization within Manistique will be assessed relative to contaminant levels and compared to reference areas.
Measures of Progress: This project will provide quantitative benthic measurements i.e., infauna diversity, abundance, in addition to legacy contaminant measurements i.e., PCB, in mussel tissue and sediment that are needed to assess changes in benthos health. Specifically this project will provide results needed to address ecosystem health, legacy contaminant levels in biota, and the benthic degradation, thus supporting directly the decisions for removal of selected BUIs based on quantitative data and targeted end points. Focus Area 1 (Measures 2,3,4,6) and Focus Area 5 (Measure 1).

Title: Marine Debris Removal in the Manistique River Area of Concern
Funding: $850,000
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010; Fish and Wildlife Coordination Act 16 U.S.C. 661, as amended by the Reorganization Plan No. 4 of 1970; Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006,16 U.S.C. 1891a; Marine Debris Research, Prevention, and Reduction Act, 33 U.S.C. 1951 et seq.; Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 et seq.; and, National Marine Sanctuaries Act, 16 U.S.C. 1431 et seq.; Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (CERCLA) 42. U.S.C. 9601 et seq.
Work - Addressing marine debris and associated contaminants in the Manistique River Area of Concern will improve the overall health of the ecosystem and directly contribute to the removal of the two remaining beneficial use impairments (restrictions on dredging activities and restrictions on fish and wildlife consumption), ultimately delisting the AOC.
Milestones and Measureable Outcomes

- Removal of the Fish Consumption Advisories BUI and Restrictions on Dredging
- Implement actions necessary to delist the Manistique River AOC

Applicable Goals, Objectives, and Measures from Action Plan

Focus Area 1 Measures:

1. Number of AOCs in the Great Lakes where all management actions necessary for delisting have been implemented (1)
2. AOC BUIs removed (2)
3. BUI delisting project starts at AOCs (2)

Focus Area 4 Measure:

9. Number of habitat-related BUIs removed (2)

Invasive Species

Title: Forecasting Spread and Bio-economic Impacts of AIS from Multiple Pathways to Improve Management and Policy in the Great Lakes
Amount: $687,617
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010; 16 U.S.C. § 1456c
Work: FY 2012 activities of this project represent a continuation of a 5-year award by NOAA to the University of Notre Dame using NOAA base funding and GLRI funds from EPA to fully support the grant. The project is also Action 2.4.5 of the Asian Carp Control Strategy Framework. This project combines scientific, economic, risk analysis, and management expertise to increase capabilities for forecasting both ecological and economic impact of current and future species invasions, quantify major uncertainties and ways to reduce uncertainty, and identify actions to improve cost effective management of invasive species in the Great Lakes (GL). Without accurate forecasts of the arrival and bio-economic impact of non-indigenous species, natural resource management cannot cost effectively respond to current invasions or prevent future invasions.
Milestones:

- Deliver forecasts of propagule pressure, probability of establishment
- Publish GIS data layers for invasive species in GLs
- Deliver date layers of current distribution of selected invasive species in their native and introduced ranges
- Publish habitat suitability maps for selected invasive species in GLs
- Deliver forecast of natural background dispersal for selected invasive species in GLs
- Deliver forecast of dispersal for selected invasive species in GLs via key pathways
- Deliver risk assessment of selected invasive species in GLs
- Develop models to estimate effectiveness and costs of alternate management responses for selected invasive species in GLs
- Develop management recommendations for selected invasive species in GLs with advisory panels
- Communicate results to decision makers via advisory panels

Great Lakes Action Plan Measures of Progress:
This work will directly contribute to Focus Area 2 Measures. The aim of this project is to provide information to Great Lakes resource managers to evaluate the likelihood of invasion, dispersal, and establishment of new and potential invasive species. This information is critical to the development of effective management plans and technologies (Measure 3), which in turn will help achieve the ultimate objective of reducing the rate of invasive species entering the Great Lakes ecosystem (Measure 1). By helping identify which species are truly of concern, the project will allow managers to put in place management plans for the most likely species. Similarly by determining the likely locations where new species may become established, managers can develop new or utilize existing technologies appropriate to preventing establishment, containing spread, and eradicating them.

Title: Asian Carp Education and Outreach
Funding: $98,000
Authority: P.L. 111-88 the Interior, Environment and Related Agencies Appropriations Act
Work: The Great Lakes Sea Grant Network will respond to opportunities and requests for education and outreach on Asian carp and regional control efforts within each of the eight Great Lakes states. Opportunities and requests will be coordinated as needed with the ACRCC and CEQ. Target Audiences may include anglers, charter captains, teachers and students, the general public, elected officials, resource managers, decision makers, marina operators, boaters, port directors, coastal county commissioners and mayors, and many partner or collaborating organizations including TNC, DNRs, USEPA, USGS, the Great Lakes Fishery Commission, the International Joint Commission, and others.
Milestones:

- Determine in cooperation with ACRCC and its Communication Working Group, a list of already developed Asian Carp outreach materials, determine gaps, and determine the additional materials to be developed.
- Participate in the development of materials.
- As needed and requested, Sea Grant Education and Outreach and Extension staff to conduct and participate in local/state opportunities for Asian Carp outreach.

Great Lakes Action Plan Measure of Progress:
This work will directly contribute to Focus Area 2 Measures:

1: Rate of nonnative species newly detected in the Great Lakes ecosystem
4: Number of recreational and resource users contacted on best practices that prevent the introduction and spread of invasive species

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Habitat and Wildlife Protection and Restoration

Title: Coastal and Estuarine Land Conservation in the Great Lakes
Funding: $844,486
Authority: 16 USC 1456-1 (enacted via P.L. 111-11 Omnibus Public Lands Management Act of 2009).
Work: NOAA's Office of Ocean and Coastal Resource Management (OCRM) expects to fund one coastal land acquisition project through $834,000 in FY2012 GLRI funding allocated to NOAA's Coastal and Estuarine Land Conservation Program (CELCP). CELCP provides state and local governments with matching funds to purchase significant coastal and estuarine lands, or conservation easements on such lands, from willing sellers. GLRI funds awarded through the CELCP will protect wetlands and other significant coastal habitats, reduce coastal water pollution, and provide the public with access to our coasts. CELCP projects are selected through a national competition. Available monies are allocated in rank order until funds are exhausted. GLRI funds will be awarded, above and beyond available CELCP funds, to eligible Great Lake proposals until funds are exhausted. The FY2012 CELCP ranked list is available online at http://coastalmanagement.noaa.gov/land/media/rankedlist.pdf.
Great Lakes Action Plan Measure of Progress:
Focus Area 4 Measure:

7. Number of acres of coastal, upland, and island habitats protected, restored and enhanced. *NOAA estimates that 44-112 acres of coastal habitat will be permanently protected through fee simple acquisition.*

Title: Great Lakes Area of Concern Land Acquisition Grant Program
Funding: $844,468
Authority: Fish and Wildlife Coordination Act 16 U.S.C. 661, as amended by the Reorganization Plan No. 4 of 1970;
Work: NOAA's Office of Ocean & Coastal Resource Management (OCRM) will use GRLI funds to support approximately two to three competitively-selected projects that are "ready and eligible" for funding in FY 2012. This competition will provide for the permanent protection of wetlands and other important coastal habitat. In addition, an AOC-focused land acquisition competition provides the first step of establishing a pipeline of restoration projects for GLRI funding. EPA and NOAA's other AOC-focused solicitations would provide both restoration planning, design and implementation funds to complete the pipeline of restoration projects contributing toward delisting habitat related beneficial use impairments.
Great Lakes Action Plan Measure of Progress:
Focus Area 4 Measures:

6. Number of acres of wetlands and wetland-associated uplands protected, restored and enhanced (*estimated 20-50 acres of wetlands protected*)
7. Number of acres of coastal, upland, and island habitats protected, restored and enhanced (*estimated 20-50 acres of coastal uplands* protected)
9. Number of habitat-related BUIs removed from the 27 U.S. AOCs so impaired (*projects will contribute to removal of at least 2 habitat related BUIs*).

While it is not possible to provide exact acreage figures until the FY2012 AOC Land Acquisition projects have been selected, based on previous land acquisition grant competitions, NOAA estimates that two-three applications will be funded through this proposal, providing for the permanent protection of an estimated 40-100 acres of coastal habitat. Of this total, NOAA is estimating that ~ 20-50 acres of wetlands will be acquired; the remainder of the acreage to be acquired will contain coastal upland habitat.

Title: Area of Concern project design and implementation
Funding: $4,597,468
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010; Fish and Wildlife Coordination Act 16 U.S.C. 661, as amended by the Reorganization Plan No. 4 of 1970; Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006,16 U.S.C. 1891a; Marine Debris Research, Prevention, and Reduction Act, 33 U.S.C. 1951 et seq.; Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 et seq.; and, National Marine Sanctuaries Act, 16 U.S.C. 1431 et seq.
Work: Direct solicitation for restoration projects will be made through NOAA's Restoration Center. This program funds projects that improve habitat condition and function with benefits for coastal communities. The GLRI funded solicitation will request restoration project proposals from Areas of Concern leading to quantifiable reductions of habitat-related beneficial use impairments as measured against either project-based delisting targets or numeric delisting targets. Importantly, RAP Implementation Groups are endorsing projects ensuring high quality proposals and projects that directly contribute to AOC highest priorities for delisting.
Milestones and Measureable Outcomes: Habitat-related BUI removals and project starts are the primary measurable outcomes; secondary outcomes include areas restored and river miles opened. At FY12 funding level of $4.5 M, NOAA anticipates funding 2-4 project starts that will directly contribute to the removal of 3-6 habitat-related BUIs and ultimately contributing to delisting of 1-3 AOCs.
Great Lakes Action Plan Measure of Progress:
Focus Area 1 Measures:

2. AOC BUIs removed (*NOAA anticipates funding 2-4 project starts that will directly contribute to the removal of 3-6 habitat-related BUIs and ultimately contributing to delisting of 1-3 AOCs*).
3. BUI delisting project starts at AOCs (*NOAA anticipates funding 2-4 project starts*).

Focus Area 4 Measures:

1. Miles of rivers reopened for fish passage (*NOAA anticipates funding 2-4 project starts that will open approximately 100 stream miles*).
2. Number of fish passage barriers removed or bypassed (*NOAA anticipates funding 2-4 project starts that will remove or bypass between 1-4 fish passage barriers*).
6. Number of acres of wetlands and wetland-associated uplands protected, restored and enhanced (*NOAA anticipates funding 2-4 project starts that will restore or enhance approximately 200 acres of wetlands*).
7. Number of acres of coastal, upland, and island habitats protected, restored and enhanced (*NOAA anticipates funding 2-4 project starts that will restore or enhance approximately 500 acres of coastal and upland areas*).
9. Number of habitat-related BUIs removed from the 27 U.S. AOCs so impaired (*NOAA anticipates funding 2-4 project starts that will directly contribute to the removal of 3-6 habitat-related BUIs and ultimately contributing to delisting of 1-3 AOCs*).

Title: Area of Concern Habitat Restoration Partnerships
Funding: $427,468
Authority: Fish and Wildlife Coordination Act 16 U.S.C. 661 and Magnuson-Stevens Fishery Conservation and Management Reauthorization Act 16 U.S.C. 1891a
Work: This program will fund two or more competitively established, regionally focused multi-year coastal habitat restoration partnerships. Working through these partnerships we will jointly identify, evaluate, fund, and administer mid-scale, watershed level projects in Great Lakes Areas of Concern. NOAA's Restoration Center Great Lakes Region is currently partnering with Ducks Unlimited, The Nature Conservancy, and the National Wildlife Federation. Through these partnerships, we focus on providing climate change expertise to inform restoration planning and implementation, design and engineering, conducting on the ground restoration work, and assisting with project evaluation to inform future restoration efforts.
Milestones and Measureable Outcomes - NOAA will work with partners to implement priority projects in AOCs that will directly contribute to removal of habitat-related BUIs. Contribution to removing habitat-related BUIs is based on funding available (estimate based on FY11: contribute to 4-8 BUI removals) and ultimately contributing to delisting of 2-6 AOCs.
Great Lakes Action Plan Measures of Progress:
Focus Area 1 Measures:

2. AOC BUIs removed (*NOAA anticipates funding 1-3 project starts that will directly contribute to the removal of 4-8 habitat-related BUIs and ultimately contributing to delisting of 2-6 AOCs*).
3. BUI delisting project starts at AOCs (*NOAA anticipates funding 1-3 project starts*).

Focus Area 4 Measures:

1. Miles of rivers reopened for fish passage (*NOAA anticipates funding 1-3 partners starts that will open approximately 25 stream miles*).
2. Number of fish passage barriers removed or bypassed (*NOAA anticipates funding 1-3 partners starts that will remove or bypass between 1-2 fish passage barriers*).
6. Number of acres of wetlands and wetland-associated uplands protected, restored and enhanced (*NOAA anticipates funding 1-3 partners that will restore or enhance approximately 150 acres of wetlands*).
7. Number of acres of coastal, upland, and island habitats protected, restored and enhanced (*NOAA anticipates funding 1-3 partners starts that will restore or enhance approximately 50 acres of coastal and upland areas*).
9. Number of habitat-related BUIs removed from the 27 U.S. AOCs so impaired (*NOAA anticipates funding 1-3 partners starts that will directly contribute to the removal of 4-8 BUI removals and ultimately contributing to delisting of 2-6 AOCs*).

Nearshore and Nonpoint Source Pollution

Title: Developing Predictive Models to Improve Coastal and Human Heath and Beach Water Quality Forecasting
Funding: $844,468
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010
Work: Current water quality monitoring involves a lag time between sample collection and water quality reporting. This may permit swimming at coastal beaches when bacterial levels could pose health threats or unregulated toxic algal blooms occur. Predictive models enable environmental and public health officials to notify the public of expected water quality one to two days in advance thereby preventing beach closures when conditions are safe and avoiding negative local economic impacts. The purpose of this work is to develop and implement techniques for predicting water quality at beaches up to two days in advance and for forecasting the trajectory and fate of harmful algal blooms in the Great Lakes.

In FY12 we will connect our statistical and mechanistic HAB decision support systems to incorporate watershed loading at rivermouths (e.g. phosphorus loading) into Lake Erie to further transition our Lake Erie HAB Forecast Bulletin into an operational tool and provide information to management agencies on the effects of watershed loading on the growth and persistence of Microcystis blooms. We will also conduct field sampling in an event response manner and collect samples during the algal bloom season when blooms are present and in locations where blooms are found. FY12 beach water quality forecasting areas include St. Louis River Minnesota AOC, Presque Isle Pennsylvania AOC, Rochester Embayment AOC, and Huntington Beach Ohio. Beach managers working with USGS and/or local science consortiums have developed nowcast models in these areas but have not developed sustainable product delivery mechanisms. Working with USGS we plan to evaluate the strengths and weaknesses of both USGS and NOAA water quality forecasting support tools. We plan to work with the NOAA National Weather Service, which has extensive experience in this area, to examine what is needed for operational beach water quality forecasting. We also intend to build a bacterial analysis capacity at the NOAA Great Lakes Environmental Research Laboratory to enable assessment of beach water quality measurements for E. coli.

Milestones:

- Complete plume model development for Saginaw River and Fox River
- Bacterial analytical laboratory set up begins
- Begin field sampling in western Lake Erie to assist with distribution of HAB bulletin
- Begin dissemination of weekly HABs bulletin for western Lake Erie
- Deploy a moored data buoy in western Lake to collect high frequency environmental data to supplement regular sampling
- Complete target watershed loading models
- Begin the process of developing a HABs bulletin for Saginaw Bay, Lake Huron, patterned after the Lake Erie HAB bulletin
- Develop test bed for beach water quality forecasts for target locations with NWS
- Evaluate Strengths and Weakness of Forecast Decision Support Tools (USGS/NOAA)
- Finish preparation of operational-ready Lake Erie HABs bulletin

Great Lakes Action Plan Measure of Progress:
Focus Area 3 Measures:

1. Five year average annual loadings of soluble reactive phosphorus from tributaries draining targeted watersheds:

- Estimated Progress During Project Period: 50% progress of identifying annual loadings from tributaries draining targeted watershed

3. Extent (sq. miles) of Great Lakes Harmful Algal Blooms:
    - Estimated Progress During Project Period: 10%
4. Annual number of days U.S. Great Lakes beaches are closed or posted due to nuisance algae:
    - Estimated Progress During Project Period: 30%

Title: Identify Land Use Indicators and Tipping Points That Threaten Great Lakes Ecosystems
Funding: $333,468
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010
Work: The purpose of this project is to identify land use indicators and tipping points in Great Lakes nearshore areas that can be used to develop policies, ordnances and land protection programs, and identify restoration priorities needed to sustain Great Lakes ecosystems. In this third year of the project, we describe tasks and deliverables designed to expand and synthesize the modeling capabilities and analyses to other watersheds that were developed and applied in the Muskegon River and Saginaw Bay during years one and two of the project. Specifically, we will expand the geographic scope of the project to include other watersheds including Grand Traverse Bay (recreational), the Grand River (mostly urban), St. Joseph (traditional row crop) and Green Bay (pasture/dairy), WI watersheds. Staff of Indiana-Illinois Sea Grant will convene federal and university scientists and facilitate a process necessary to develop land use change and agricultural land indicators (based on our and related research) that can be used in the ongoing SOLEC process. The Illinois-Indiana Sea Grant College program will work with sustainable coastal community development specialists in the Great Lakes Sea Grant network to develop and deliver decision making products based on this research that empowers Great Lakes communities to make land use decisions that protect or restore water and habitat components necessary to sustain Great Lakes ecosystems. Research staff at NOAA-GLERL will oversee the project and provide critical input on regional hydrology and fisheries biology.
Milestones:

- Identify Land Use Indicators
- Develop and apply Causal statistical models, fish habitat quality models, expand mechanistic fish models and CART Model to identify tipping points
- Compare output from CART model, causal model, mechanistic coupled model and fish habitat quality model
- Extend the Hierarchical Tipping Point Models to Include Bacterial Contaminants.
- Develop and apply food web model to evaluate land use tipping points for nearshore areas in southeastern Lake Michigan
- Integrate, compare model predictions of tipping points
- Identify specific land use tipping points that change biological and/or contaminant outcomes, and develop decision tool data layer and supporting outreach materials
- Conduct a Demonstration of Use

Great Lakes Action Plan Measure of Progress:
This project will support efforts to reduce five year average annual loadings of soluble reactive phosphorus from tributaries draining targeted watersheds (Measure 1) and reduce the extent of Great Lakes Harmful Algal Blooms (Measure 3) and will also support a variety of educational,

evaluative, planning, coordination, and implementation activities among stakeholders (Focus Area 5).

Title: 2012-640 LaMPs and Landcover Assessment
Funding: $173,468
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010
Work: NOAA will provide expertise, products and services related to the needs of the LaMPs for all five lakes. This project will support both the LaMPs and priority watershed areas in three primary ways: 1. Utilize the Coastal Change Analysis Program (C-CAP), as funding allows, for updates on lakes Erie and Ontario; 2. Support for the LaMP process in all five Great Lakes by coordinating our staff and programs to their greatest benefit and need; and 3. Develop strategies and enhance capacity for monitoring and analysis of priority watershed decision-making and its socio-cultural context. This work will focus on the decision-making communities of the watersheds for the St. Louis River, Saginaw Bay and Maumee River AOCs.
Milestones:

- NOAA's Coastal Services Center will conduct a 2011 C-CAP update for the US side of the Erie Basin (no additional back date imagery will be analyzed);
- NOAA's Coastal Services Center will also conduct a 2011 C-CAP update for a very small portion of the US side of the Lake Ontario basin (exact locations will be determined based upon feedback from regional partners and C-CAP data users);
- NOAA's Great Lakes Environmental Research Lab will provide expert support focused on the three watershed AOC communities.

Great Lakes Action Plan Measure of Progress:
Focus Area 3 Measures:

C-CAP will analyze changes to land cover and land use, which directly impacts Measures 1 – Annual loadings of SRP and Measure 5 – volume of sediment deposition.

Focus Area 5 Measures:

All work done in collaboration with the LaMPs will add to Measure 2 - the total number of specific priority LaMP projects completed.

Accountability, Evaluation, Communication, Monitoring and Partnerships

Title: Implementation of the Great lakes Synthesis, Observations and Response System (SOAR)
Funding: $1,094,468
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010
Work: The SOAR system coordinates & integrates regional coastal observations supporting national & regional priorities including Great Lakes restoration. SOAR activities include the deployment & support of on-water and remote sensing platforms where observations from these systems are used to create database products for assessment and decision support. SOAR will provide an up-to-date (including real-time data) web presence to support accountability, management and restoration activities. The SOAR system will provide up to date information on ecosystem health to maintain high quality drinking water and bathing beaches through observations, data management, and forecast model development.

Observations of environmental parameters are used to develop decision support tools to determine success of remedial actions, provide warnings to regional managers regarding phosphorous loads, hypoxia and harmful algal blooms, and support future remedial action decisions. These decision support tools include real-time observing system components (buoys) deployed at Maumee Bay, Saginaw Bay, Muskegon and Cleveland, web-based data management system, and models for Green Bay, Saginaw Bay, and the St. Lawrence River AOCs. Instrumentation deployed in AOCs will provide observations of hypoxia, soluble reactive phosphorous and support detection of harmful algal blooms.

Great Lakes Action Plan Measures of Progress:
Work will contribute to the following Measures:
Focus Area 3 Measures:

1. Five year average annual loadings of soluble reactive phosphorus from tributaries draining targeted watersheds. Watersheds expected to be targeted for actions include the Maumee, Muskegon, Fox, Saginaw, St. Louis and Genesee Rivers.

Focus Area 5 Measures:

1. Improvement in the overall aquatic ecosystem health of the Great Lakes using the Great Lakes 40-point scale.

Title: Bay Watershed Education and Training (B-WET)
Funding: $427,468
Authority:
Work: This project establishes a formal Bay Watershed Education and Training (B-WET) program in the Great Lakes. B-WET is a NOAA environmental education program that promotes locally relevant, systemic experiential learning in the K-12 environment. B-WET offers competitive grants to support existing environmental education programs, foster the growth of new programs, and encourage development of partnerships among environmental education programs within selected watershed systems. B-WET funding supports organizations that provide "Meaningful Watershed Educational Experiences" (MWEEs) to students, either directly or through teacher professional development. These experiential opportunities are intended to supplement and enrich the traditional formal learning environment.

The FY12 Great Lakes B-WET project entails implementing the first full year of the program. This project will fund .75 FTE of a NOAA staff person, as well as administrative

support for coordinating with stakeholders and administering the grant process. NOAA will award an additional $300K in grants using FY12 funds (added to the $850K from FY11). NOAA will carry out the following tasks:

- Set up a review panel and conduct a technical review of the project proposals.
- Process grants for submission for NOAA Grants Office.
- Conduct site visits.
- Conduct ongoing evaluation.
- Administer budget for B-WET Great Lakes program
- Complete all reporting to NOAA and EPA for distributing designated GLRI funds.
- Participate in national B-WET managers' B-WET Advisory Group (B-WAG) meetings and calls and initiatives

Great Lakes Action Plan Measure of Progress:

Focus Area 5 Measure:

3. Number of educational institutions incorporating new or existing Great Lakes protection and stewardship criteria into their broader environment education criteria (*2012 GLRI target is two institutions*).

Title: Community outreach and technical assistance for assessing climate change risks and vulnerabilities within the Great Lakes region

Funding: $1,174,468 (total for all 3 projects lumped under the Climate Focus Group project)

- $212,489 for *Lake Level Viewer*
- $470,789 for the *Economic Framework for Community Adaptation*
- $491,190 for *Regional Downscaling*

Authority: Coastal Zone Management Act (CZMA, 16 U.S.C. 1456c); Economy Act

Work: This SOW reflects a comprehensive climate program aimed at providing community outreach and technical assistance for assessing climate change risks and vulnerabilities within the Great Lakes region. Projects enable informed adaptation decisions throughout the basin, given that climate change is expected to exacerbate threats to habitats, wildlife, aquatic species, and humans. To prepare for these hazards, NOAA will continue to fund outreach and technical assistance programs for Great Lakes' resource managers, basin-wide with specific emphasis on AOCs and LaMPs that have an identified the need to plan for hazards and climate change impacts. Details follow on each of the climate sub-projects:

- The NOAA Coastal Services Center will produce an online Lake Level Viewer that will accommodate increased lake level and lowered lake level scenarios. This viewer will assist in coastal decision making by enabling stakeholder groups to visualize potential impacts of such changes in lake level. This work will leverage regional partnerships developed in FY10 and FY11 through GLRI funding and will build on existing work being done for Sea Level Change nationwide (www.csc.noaa.gov/slr). Additional management applications will be built into the tool as scoped by a group of stakeholders together with NOAA CSC. These management applications will build functionality into the viewer that aids in decisions at the local level.
- The NOAA Coastal Services Center will work with two Great Lakes communities, preferably from AOC's, to expand and build upon an economic framework developed with GLRI FY'10 funding that will enable them to analyze the cost/benefits of alternative policy and adaptation strategies. The Center will also provide technical assistance to these two communities to use the economic framework with available tools and data to produce

additional economic information that can help inform local decision making. In addition, the Center will provide access to all Great Lakes communities to web-based resources and on-line training on the Digital Coast so communities can address shoreline hazards.

- NOAA GLERL will continue to develop and validate modeling components that contribute directly to calculation of the net basin supply of the Great Lakes (tributary outflow from the land, over-lake evaporation, and over-lake precipitation). Additional run simulations of climate change scenarios using existing regional climate models will be completed. NOAA GLERL will create and test simulations using the next generation of regional climate model, which will include coupling between complete 3-dimensional simulations of both the atmosphere and the Great Lakes, including ice formation and transport. All of these sub-projects will be accompanied by activities to disseminate the results via the web.

Milestones

- Pilot local community needs and applicable resources relative to the economic framework are identified
- Technical assistance in two communities to apply economic framework
- An online Lake Level Viewer that will accommodate increased lake level and lowered lake level scenarios
- All associated resources available on the Digital Coast
- Three additional model simulations using the existing models CHARM (at GLERL) and RegCM4 (at University of Wisconsin).
- Tributary outflow under CHARM simulations calibrated and validated.
- Initial run of the fully-coupled 3-dimensional air and water model completed.

Measure of Progress

- Regional downscaling project will provide a wide range of projections of impacts of climate change on various sectors of the Great Lakes region's natural and human-managed systems.
- Modeling output will be distributed/incorporated into at least two projects that will measure impacts on a natural or socio-economic sector.
- Two coastal communities will have access to and have applied the economic framework to help them choose adaptation strategies and calculate cost-benefits.
- All Great Lakes communities will have access to web resources (including the Lake Level Viewer) that promote good management strategies for shoreline hazards.
- All Great Lakes communities will have access to case studies and/or lessons learned from this project.

Title: Assessment of Lake Ontario Benthic Macroinvertebrate
Funding: $50,000
Authority: P.L. 111-88, the Interior, Environment and Related Agencies Appropriations Act, 2010
Work: The NOAA Great Lakes Environmental Research Laboratory, in collaboration with EPA Region 2, Cornell University, and University of Michigan CILER, will evaluate the composition and abundance of components of the benthic community of Lake Ontario. These data are critical to understanding the mechanisms and permitting quantitative estimation of the benthic-pelagic flux of energy and nutrients of each basin. Special attention will be given to keystone invertebrate species (*Dreissena* spp., *Diporeia* spp.). The objective of this research is to provide a statistically valid and precise estimate of lake-wide (both near and offshore) and habitat-

specific benthic invertebrate abundance and biomass (defined by depth and substrate type) of the Lake Ontario in 2013. The metrics will be used compared to environmental measures such as chlorophyll a, TP, and TOC.

Milestones

- Completion of QAPP for field and laboratory procedures - July 2012
- Collection of water quality measurements at 20 locations in Lake Ontario – April and August 2013
- Collection of benthic macroinvertebrates at 55 locations in Lake Ontario – August 2013
- Final report on the composition and abundance of components of the benthic community – January 2014

Great Lakes Action Plan Measure of Progress

This project will provide support to Focus Area 5 Measures 1 and 2 by providing a statistically valid and precise estimate of lake-wide (both near and offshore) and habitat-specific benthic invertebrate abundance and biomass (defined by depth and substrate type) of Lake Ontario.

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4. COLLABORATIVE ARRANGEMENTS

Mussel Watch Expansion -- This project will use selected laboratories with demonstrated capabilities. Formal collaborations are or will be established with TDI Brooks International for chemical analyses in tissue and sediment, University of North Carolina at Charlotte for biomarkers, and benthic infauna characterization with the University of Michigan Cooperative Institute for Limnology and Ecosystem Research (CILER), and Freshwater Benthic Services, Inc. In addition, field sampling support including divers and boat support will be sought from state and federal partners.

Mercury Air Modeling -- While there will be several *informal* collaborative arrangements, e.g., with relevant regulatory agencies and other stakeholders in the selection of emissions scenarios, there will not be any *formal* collaborative relationships associated with this project.

Sediment Database Expansion – This project will populate NOAA's Query Manager database with chemical data sets collected through GLNPO's sediment assessment grants program EPA's Superfund program, Sate sediment programs, USACE sediment programs, USGS NAWQA program, and other programs as identifies through the project. NOAA will coordinate with partners in compiling data to enter into the database. This coordination will include financial support for State partners to assist NOAA in importing the data.

Manistique – Mussel Bioaccumulation Study – Same as for Mussel Watch Expansion

Manistique – Debris Removal FS and Design -- NOAA has been engaged in a technical workgroup assessing the current research and data available in the Manistique River to better understand and design a remediation and restoration effort. This group includes scientists from EPA, USACE, USGS, and NOAA. This effort is led by the Manistique River AOC Task Force, which includes key participants from EPA, NOAA, and MDEQ. NOAA's RC will direct habitat restoration, remediation, and marine debris removal through a collaborative effort between NOAA's RC and the Marine Debris Program. NOAA's RC will directly contract this work and assign a technical monitor that will be responsible for providing hands-on assistance on technical

and permitting issues for this remediation/restoration project; monitoring the progression of the design and engineering, including one or more site visits; and participating in public events to highlight the restoration planning activities and to foster the concept of citizen-based habitat restoration.

Regional Ecosystem Prediction Program – AIS in the Great Lakes – The University of Notre Dame – The majority of the funds of this award are being used to provide additional support by CSCOR under its Regional Ecosystem Prediction Program to a competitively selected proposal submitted by University of Notre Dame. The 5-year project initially funded in FY 2009 is focused on determining the probability of establishment, amount of potential habitat, and potential for spread of current and likely invasive species as well as estimating the ecological and economic impacts of such species. The project is supported as a cooperative agreement between NOAA and University of Notre Dame under awards NA09NOS4780192 and NA10NOS4780218.

Sea Grant Outreach and Education -- NOAA will formally contract with the seven Sea Grant Programs from Minnesota, Wisconsin, Indiana-Illinois, Michigan, Ohio, Pennsylvania and New York through the National Sea Grant Program and the Great Lakes Sea Grant Network to conduct outreach and education on Asian Carp in their jurisdictions.

Developing Predictive Models to Improve Coastal and Human Heath and Beach Water Quality Forecasting – In 2009, the Beach Health Interagency Coordination Team (BHICT) was created to formalize a tri-agency partnership between EPA, NOAA, and USGS with the purpose of:

- Coordinating Great Lakes Beach Health activities at the management/federal level.
- Capitalize on the unique capabilities of each agency in the Great Lakes region.
- Utilize our individual resources more effectively and efficiently by understanding our programmatic goals, sharing tasks and capabilities whenever possible.
- Developing coordinated responses to emerging issues for Beach Health in the Great Lakes through communication with each other and our beach health partners.

NOAA Center of Excellence for Great Lakes and Human Health (CEGLHH) has set up a partnership with CDC's ATSDR (Agency for Toxic Substances Disease Registry) to coordinate projects through the Great Lakes Restoration Initiative. The focus of this partnership is to integrate ecosystem and public health and to utilize the strengths of both agencies to address the harmful algal blooms issues in Lake Erie. Through GLERL and CEGLHH's extensive field program and forecasting capabilities, which are important sources of information for CDC to help develop guidelines for Microcystin for states, we can move towards identifying and understanding the impacts of Microcystis and Microcystin on human health in the Great Lakes.

In addition, CDC ATSDR has joined the Beach Health Interagency Coordination Team, comprised of USEPA, USGS, NOAA, and CDC to further align federal beach water quality programs in the Great Lakes. The Beach Health Interagency Coordination Team has been meeting monthly since 2009.

Partnership with the National Weather Service is focused on developing a test bed for CEGLHH's beach water quality predictive decision support system to distribute the forecast in a similar manner as National Weather Service weather forecasts.

Identify Land Use Indicators and Tipping Points That Threaten Great Lakes Ecosystems -- NOAA GLERL will fund university scientists at University of Michigan, Michigan State University, and Purdue University, and Indiana Illinois Sea Grant using the collaborative arrangement with CILER.

Land Cover Monitoring in Lakes Huron, Erie and Ontario/LaMPs -- NOAA Coastal Services Center; the Great Lakes States; Lake Superior and Old Woman Creek National Estuarine Research Reserves; Thunder Bay National Marine Sanctuary; and local communities in the priority watersheds.

CELCP -- CELCP funds are awarded through a grant to a state or local unit of government.

AOC Land Acquisition -- AOC Land Acquisition Grant funds are awarded through grants to a state or local unit of government.

AOC Project Design and Implementation & Habitat Restoration Partnerships -- NOAA's Restoration Center (RC) staff participate in the Federal AOC Working Group, RWG AOC subgroup, RWG Habitat subgroup and is also a partner of the Sustain Our Great Lakes Partnership (NRCS, EPA, FWS, NWFW, Arcelor Mittal, NOAA, and FS). RC staff work closely with other federal agencies on evaluating Great Lakes habitat restoration opportunities and priorities. NOAA's RC also consults with USFWS Sea Lamprey Control Program to identify any concerns with proposed projects.

NOAA's RC also maintains strong relationships with a number of NGOs including National Wildlife Federation. Through this partnership, we focus on providing climate change expertise to inform restoration planning and implementation, design and engineering.

NOAA's RC uses cooperative agreements with partners and grantees (state agencies, universities, non-profits, etc). This agreement means that the RC participation will be crucial to ensuring the development and implementation of the most beneficial habitat restoration projects possible. Specifically, a Restoration Center Technical monitor is assigned to each project and is responsible for providing hands-on assistance on technical and permitting issues for the habitat restoration project; monitoring the progression of the restoration from implementation to post-construction monitoring, including one or more site visits; and participating in public events to highlight the restoration activities and to foster the concept of citizen-based habitat restoration.

NOAA's RC also requires letters of endorsement from the RAP Implementation Group (defined as the state agency responsible for implementing the Area of Concern program or the local public stakeholder group working with the state agency on implementing the RAP) ensuring high quality proposals and projects that directly contribute to AOC highest priorities for delisting.

B-WET -- B-WET funds are awarded through grants.

Climate Projects -- The NOAA Coastal Services Center will work with state and local partners in the region. Formal agreements are still being determined once they know the budget and have had formal discussions with local and state decision-makers and potential project partners. Partners may include Sea Grant, National Estuarine Research Reserves, Digital Coast partners (state and local representatives of Association of State Flood Plain Managers, The Nature Conservancy, National Association of Counties, Coastal States Organization, American Planning

Association, National States Geographic Information Council), and extension agents.

NOAA GLERL will continue to collaborate with the University of Wisconsin's Center for Climate Research, and also with the University of Maryland's Earth System Science Interdisciplinary Center.

Assessment of Lake Ontario Benthic Macroinvertebrate -- NOAA Great Lakes Environmental Research Laboratory will collaborate with EPA Region 2, Cornell University, and University of Michigan CILER.

Great Lakes Restoration Initiative
Project Funding Summary Spreadsheet
FY 12
($14,508,767)

7/5/2012

NOAA

GREY AREAS WILL AUTOMATICALLY CALCULATE TOTALS

Focus Area 1: Toxic Substances and Areas of Concern

Template Number	Template Name	Personnel	Fringe Benefits	Travel	Equipment	Other	Grants	Contracts	Procurement / Assistance[2]	Sub-Total	Indirect Cost	Total
2012-044	Expanded Mussel Watch Monitoring	$45,000	$15,000	$50,000	$7,000	$40,468		$237,000	$237,000	$394,468		$394,468
2012-048	Modeling Atmospheric Mercury Deposition to the Great Lakes	$63,826	$18,318	$0	$0	$15,470	$0	$20,000	$20,000	$117,613	$52,857	$170,470
2012-046	Great Lakes Sediment Contamination Database	$38,680	$10,550			$10,468		$34,070	$34,070	$93,768	$1,700	$95,468
2012-43-3	Marine Debris Removal in the Manistique River AOC	$87,000		$13,000				$750,000	$750,000	$850,000		$850,000
2012-44-1	Mussel Bioaccumulation Study -- Manistique	$6,000	$2,000	$10,000	$2,000			$68,200	$68,200	$88,200	$1,800	$90,000
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
	Sub-total	$240,506	$45,868	$73,000	$9,000	$66,406	$0	$1,109,270	$1,109,270	$1,544,049	$56,357	$1,600,406

Focus Area 2: Invasive Species

Template Number	Template Name	Personnel	Fringe Benefits	Travel	Equipment	Other	Grants	Contracts	Procurement / Assistance[2]	Sub-Total	Indirect Cost	Total
2012-675	Regional Ecosystem Prediction-AIS in the Great Lakes			$13,500		$9,500	$664,617		$664,617	$687,617		$687,617
2012-675-1	Asian Carp Outreach and Education						$98,000		$98,000	$98,000		$98,000
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
	Sub-total	$0	$0	$13,500	$0	$9,500	$762,617	$0	$762,617	$785,617	$0	$785,617

Focus Area 3: Habitat and Wildlife Protection

Template Number	Template Name	Personnel	Fringe Benefits	Travel	Equipment	Other	Grants	Contracts	Procurement / Assistance[2]	Sub-Total	Indirect Cost	Total
2012-43-1	Coastal and Estuarine Land Conservation in the Great Lakes					$36,689	$2,012,901	$105,942	$2,118,843	$2,156,532		$2,156,532
2012-43-2	Great Lakes Area of Concern Land Acquisition Grant Program					$10,468	$792,300	$41,700	$834,000	$844,468		$844,468
2012-053	Area of Concern project design and implementation	$300,000		$7,500		$10,468	$4,150,000	$129,500	$4,279,500	$4,597,468		$4,597,468
2012-050	Habitat Restoration Partnerships	$17,000				$10,468	$400,000		$400,000	$427,468		$427,468
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
	Sub-total	$317,000	$0	$7,500	$0	$68,093	$7,355,201	$277,142	$7,632,343	$8,024,936	$0	$8,024,936

Great Lakes Restoration Initiative
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Focus Area 4. Nearshore Health and Nonpoint Source Pollution

Template Number	Template Name	Personnel	Fringe Benefits	Travel	Equipment	Other	Grants	Contracts	Procurement Assistance	Sub-Total	Indirect Cost	Total
2012-062	Developing Predictive Models to Improve Coastal and Human Health and Beach Water Quality Forecasting	$82,887	$78,387	$20,000	$25,000	$73,611	$564,583		$564,583	$844,468	$0	$844,468
2012-063	Identify Land Use Indicators and Tipping Points That Threaten Great Lakes Ecosystems			$2,599	$5,000	$10,468	$315,401		$315,401	$333,468		$333,468
2012-640	LaMPs and Landcover Assessment	$105,000		$10,000		$10,468		$48,000	$48,000	$173,468		$173,468
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
	Sub-total	$187,887	$78,387	$32,599	$30,000	$94,547	$879,984	$48,000	$927,984	$1,351,404	$0	$1,351,404

Focus Area 5. Accountability, Education, Monitoring, Evaluation, Communication and Partnership

Template Number	Template Name	Personnel	Fringe Benefits	Travel	Equipment	Other	Grants	Contracts	Procurement Assistance	Sub-Total	Indirect Cost	Total
2012-209	Implementation of the Great Lakes Synthesis, Observations and Response System	$67,916	$64,228	$11,000	$148,283	$47,268	$201,773	$554,000	$755,773	$1,094,468		$1,094,468
2012-610	Bay Watershed Education and Training (B-WET) program	$71,000	$22,000	$10,000	$1,000	$21,468	$300,000	$2,000	$302,000	$427,468		$427,468
2012-303	Climate Change Impacts Information and Outreach	$74,187	$16,374	$50,565	$5,375	$11,468	$1,002,973		$1,002,973	$1,160,942	13,526	$1,174,468
2012-063-1	Assessment of Lake Ontario Benthic Macroinvertebrate	$11,094	$2,995	$4,115		$1,000	$13,577	$9,500	$23,077	$42,281	$7,719	$50,000
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
									$0	$0		$0
	Sub-total	$224,197	$105,597	$75,680	$154,658	$81,204	$1,518,323	$565,500	$2,083,823	$2,725,159	$21,245	$2,746,404
	AWARD TOTAL	$969,590	$229,852	$202,279	$193,658	$319,750	$10,516,125	$1,999,912	$12,516,037	$14,431,165	$77,602	$14,508,767

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7/5/2012

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